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Lamy et al.

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(54) **SHOWER DEVICE WITH MULTI-PRODUCT DISPENSING CAPABILITY**

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A62C 5/02 (2006.01)
E03C 1/046 (2006.01)
B05B 1/18 (2006.01)

(52) **U.S. Cl.**
CPC .. ***E03C 1/046*** (2013.01); ***B05B 1/18*** (2013.01)

(58) **Field of Classification Search**
CPC B05B 1/18; B05B 7/2462; B05B 7/0408; B05B 7/1209; E03C 1/046; B65D 85/808
USPC 239/310, 314, 316–318, 409
See application file for complete search history.

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(57) **ABSTRACT**

A two-stage coaxial shower head that allows conventional water flow through the shower head or a mixture of product and water through a product low flow nozzle. The product may be such liquids as soap, moisturizer, shampoo, or hair conditioner. Products are contained within product pressure reservoirs each with a product section and a piston. During a shower, a user rotates a selector dial at the multi-ported spool valve to select a product or conventional water flow for rinsing. When a product is selected water flow through a water supply tube from the multi-ported spool valve to the shower head will cease and pressure to force water down to the lower part of a product reservoir to raise the piston in the product pressure reservoir to reject product that is transported to a shower head section. A version using electronics instead of hydraulics is also presented.

6 Claims, 9 Drawing Sheets

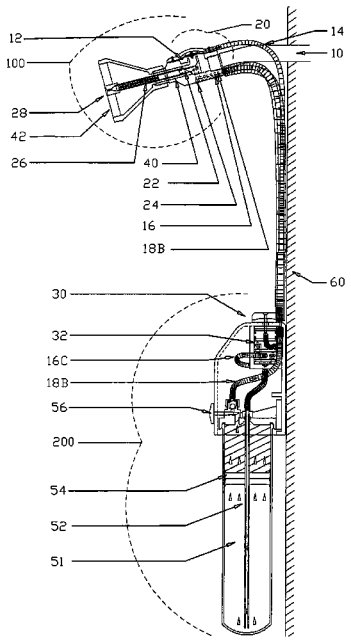
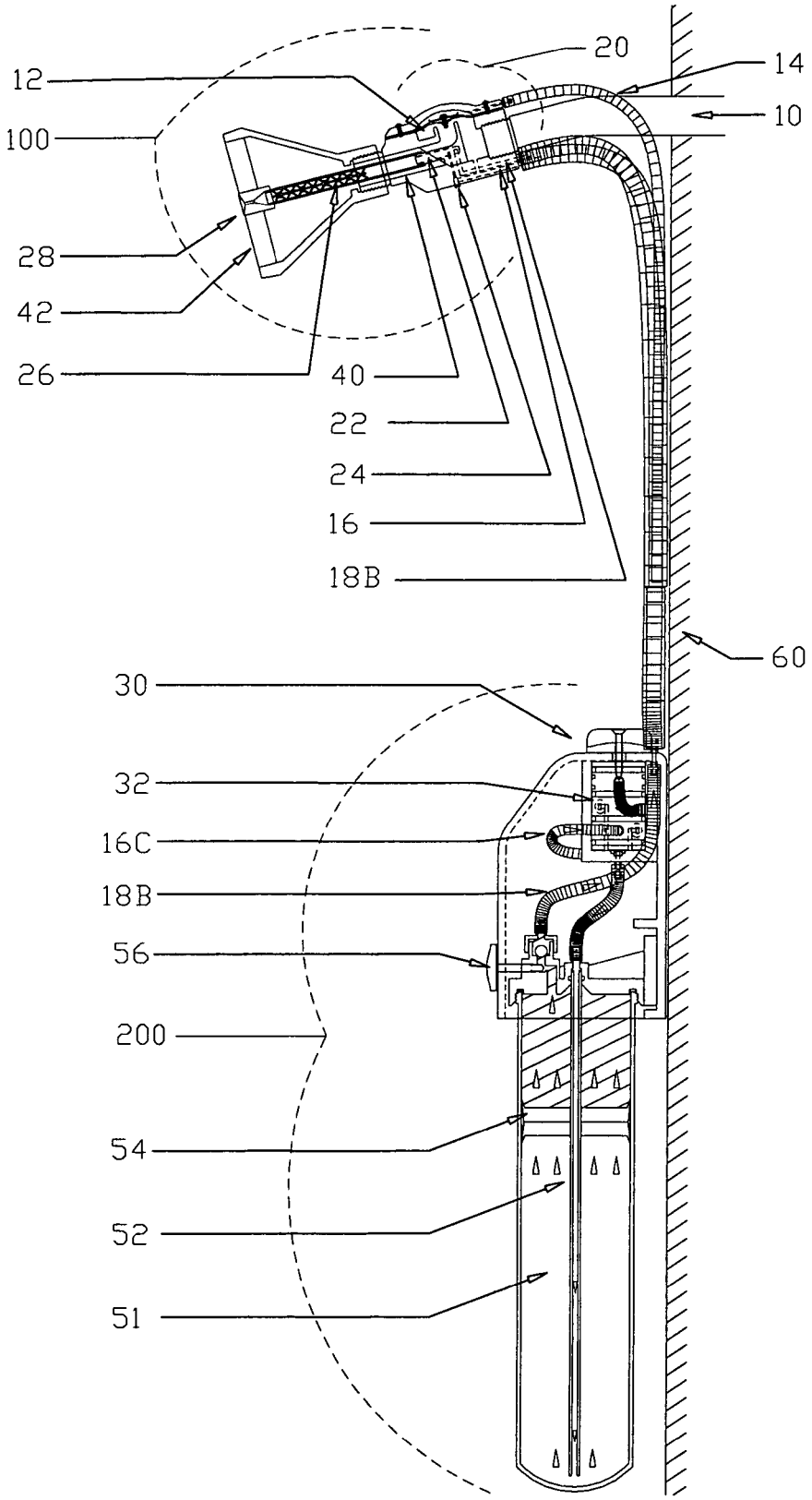


FIGURE 1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100
28
42
26
20
14
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22
24
16
18B
60
30
32
16C
18B
56
200
54
52
51

FIGURE 2

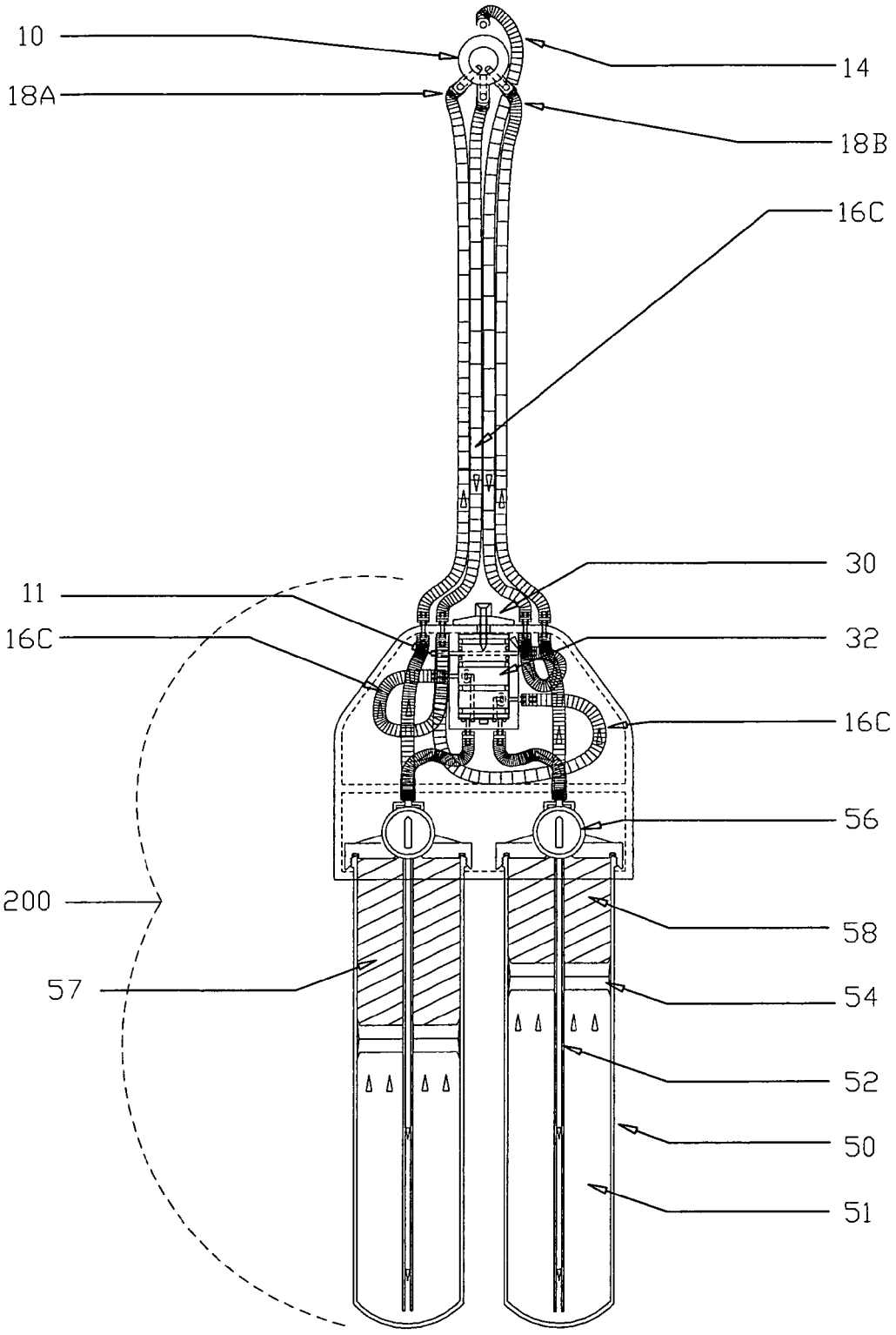


FIGURE 3

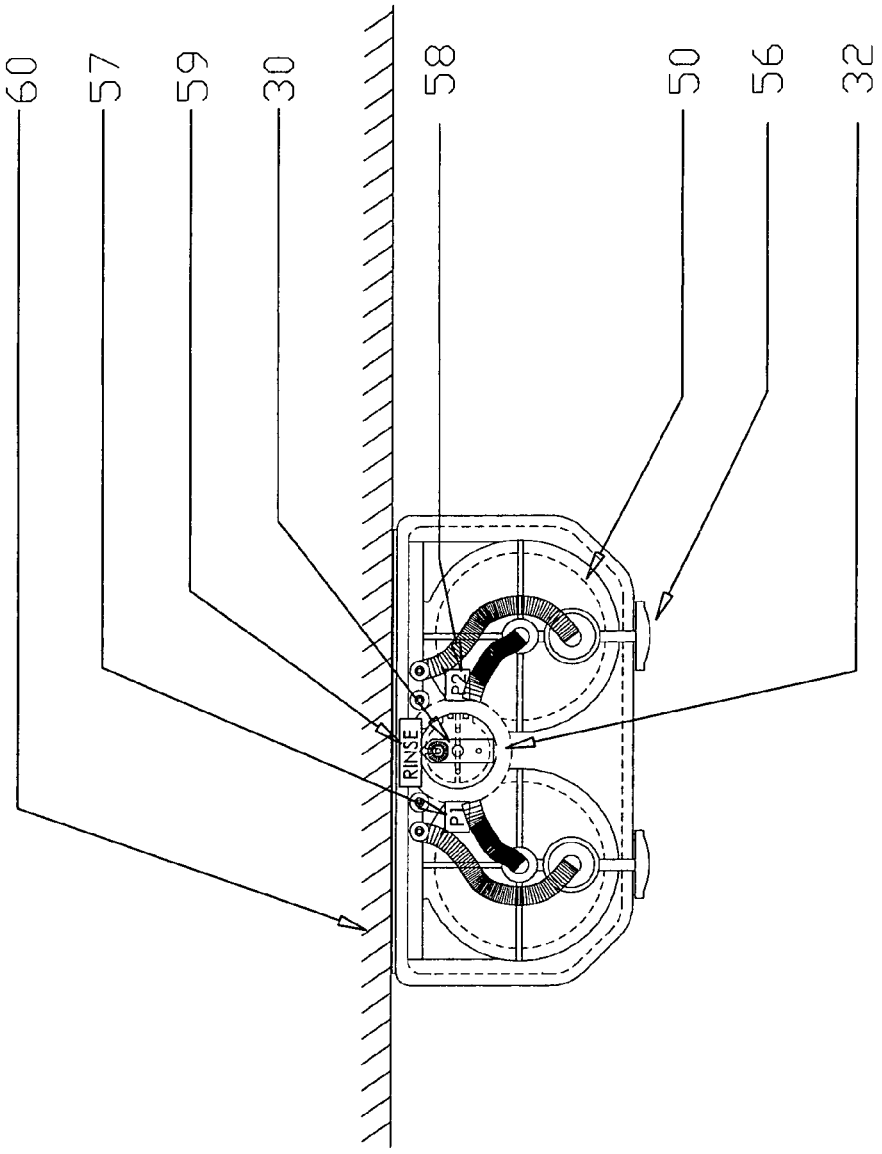


FIGURE 4A

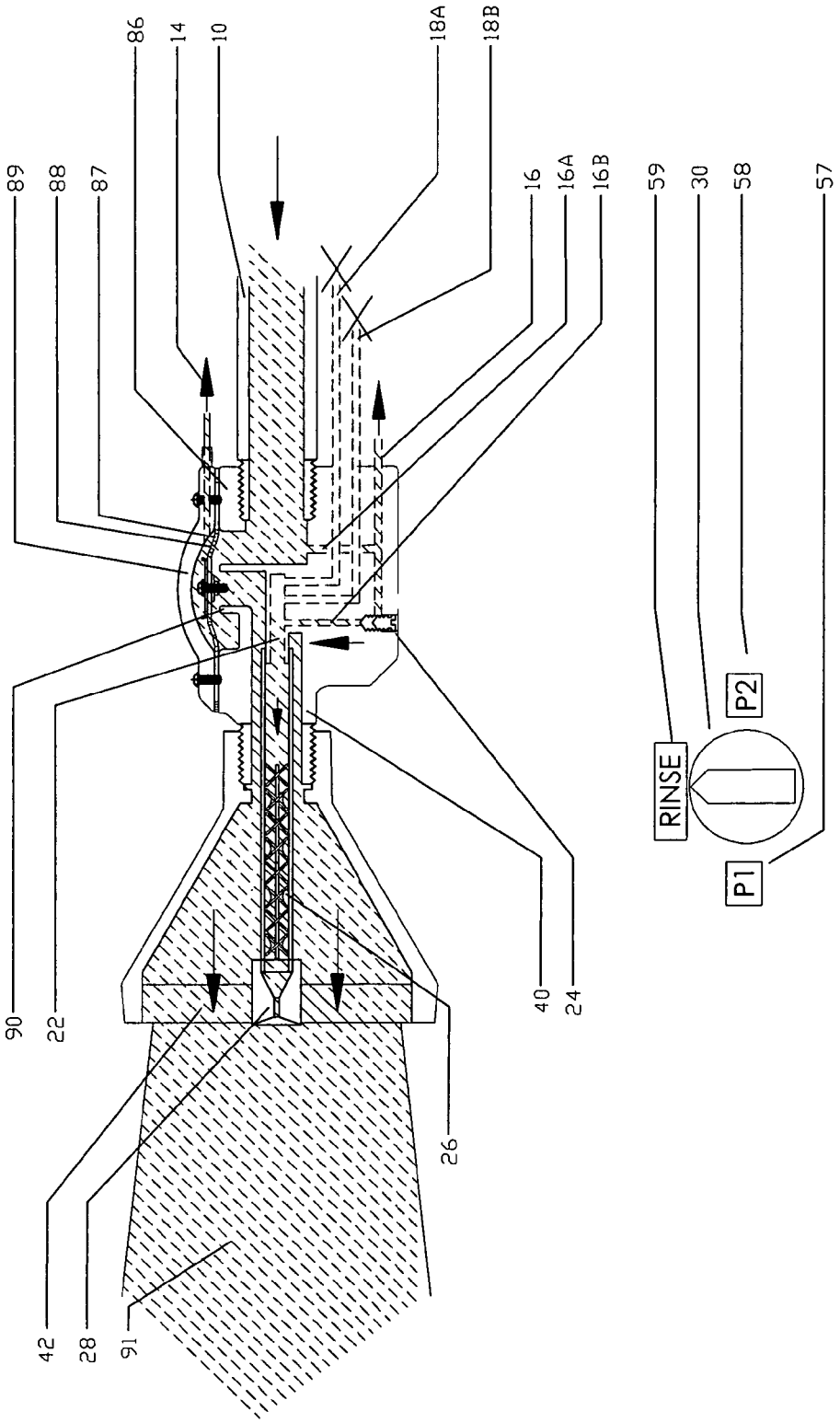
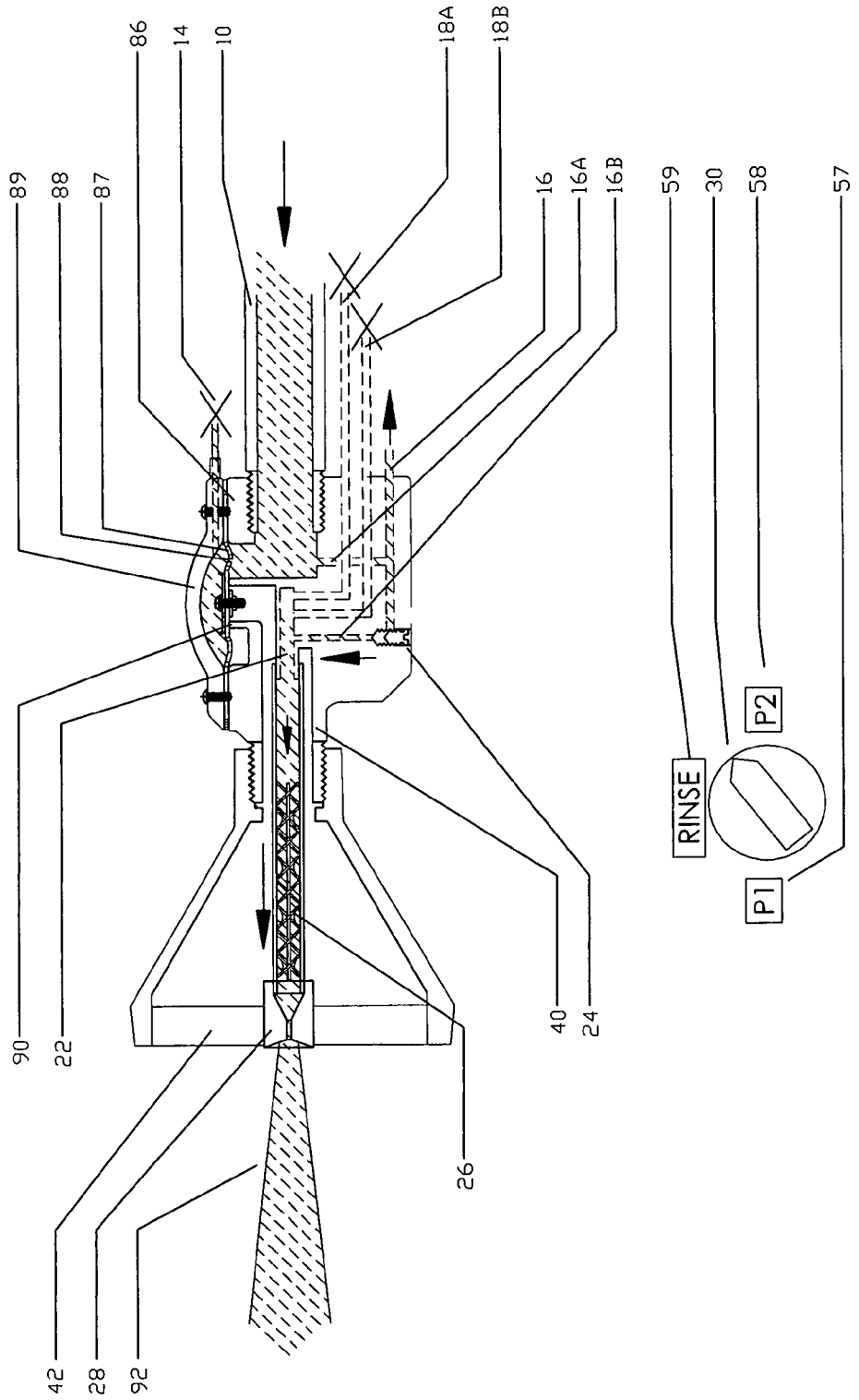

86
14
10
18A
18B
89
88
87
16
16A
16B
59
30
58
57
RINSE
P2
P1
90
22
40
24
26
42
28
91

FIGURE 4B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16A
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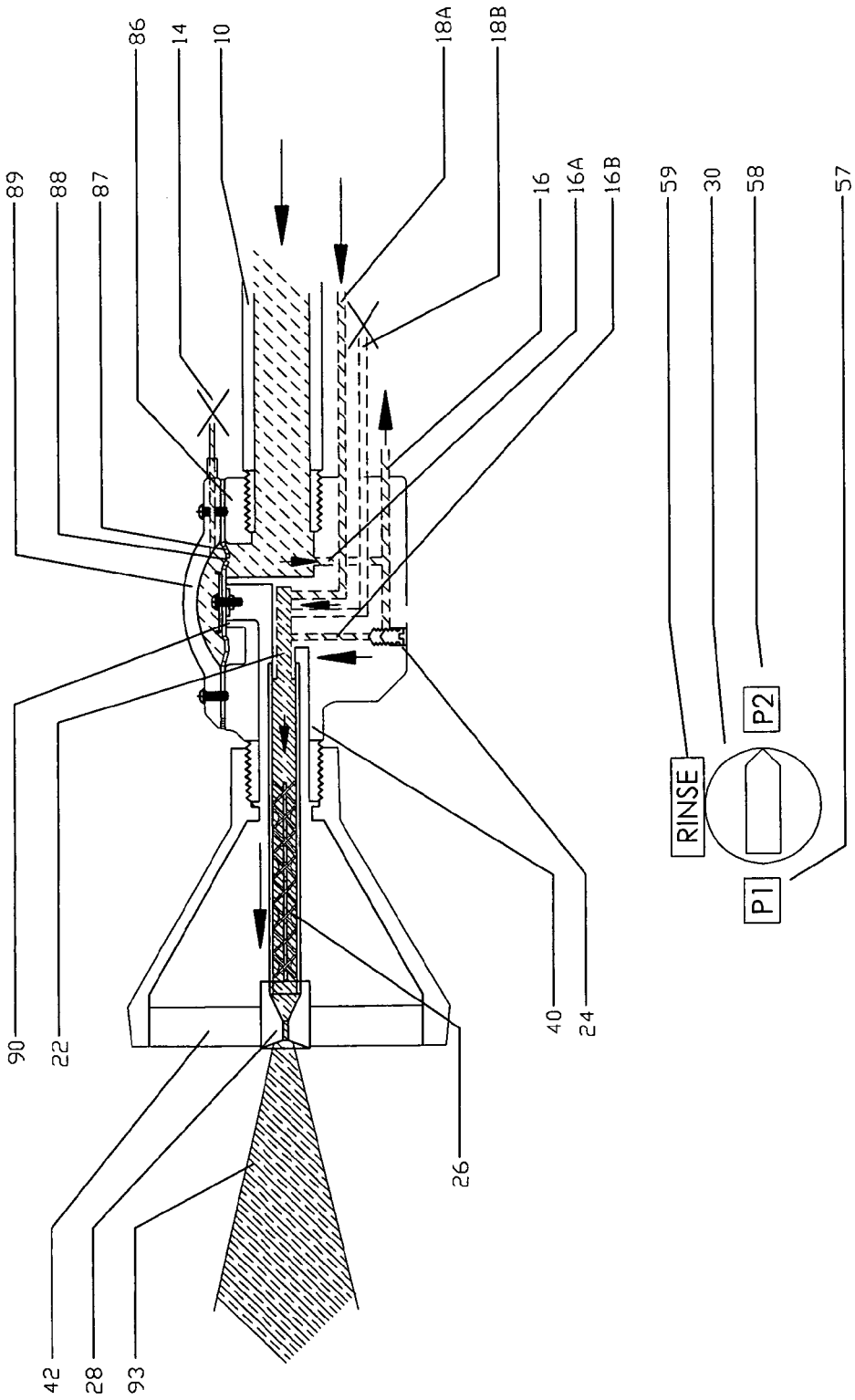
RINSE
P2
P1
90
22
40
24
26
42
28
92

FIGURE 4C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RINSE
P2
P1
90
22
40
24
26
42
28
93

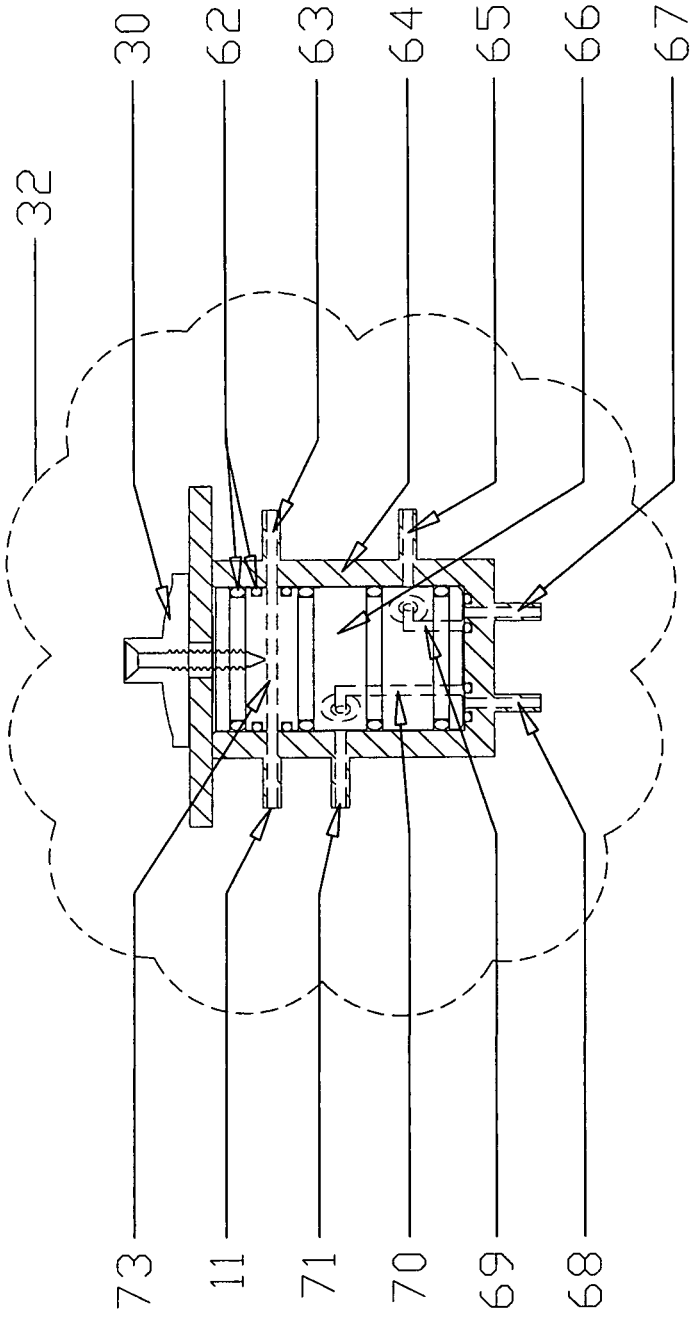


FIGURE 5

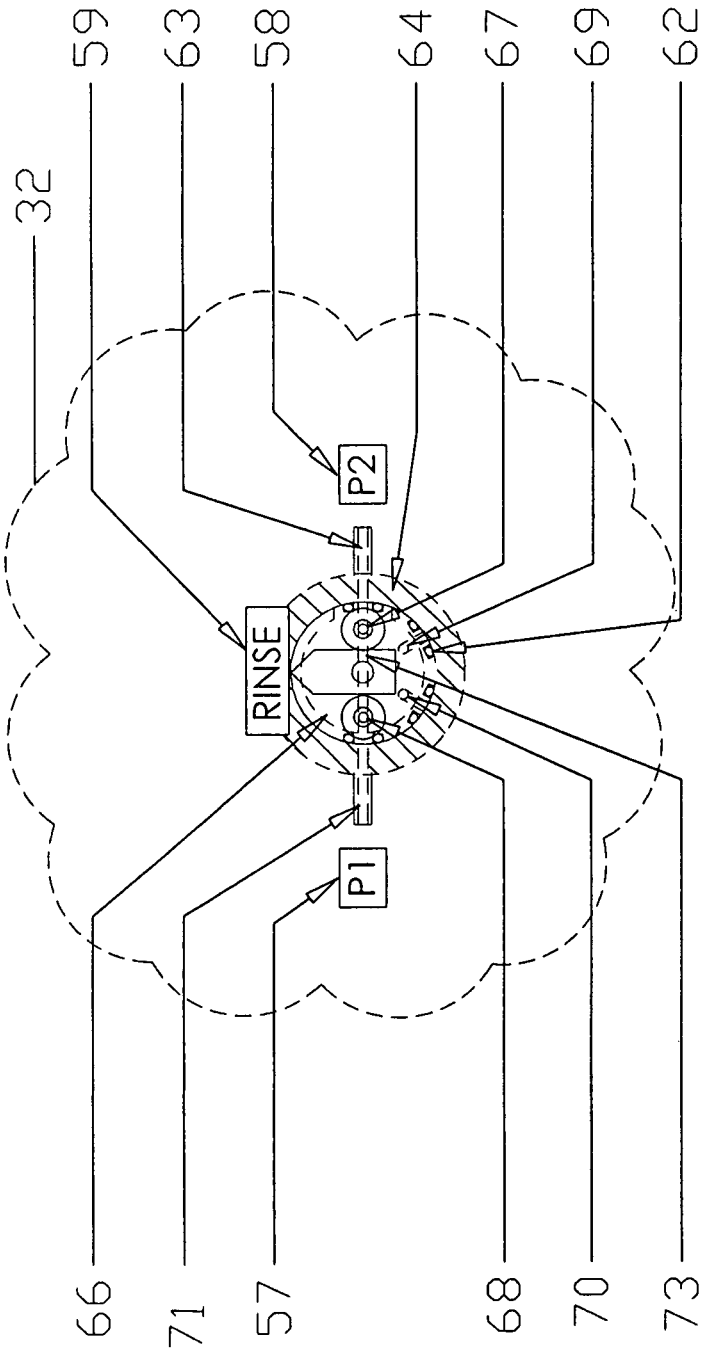
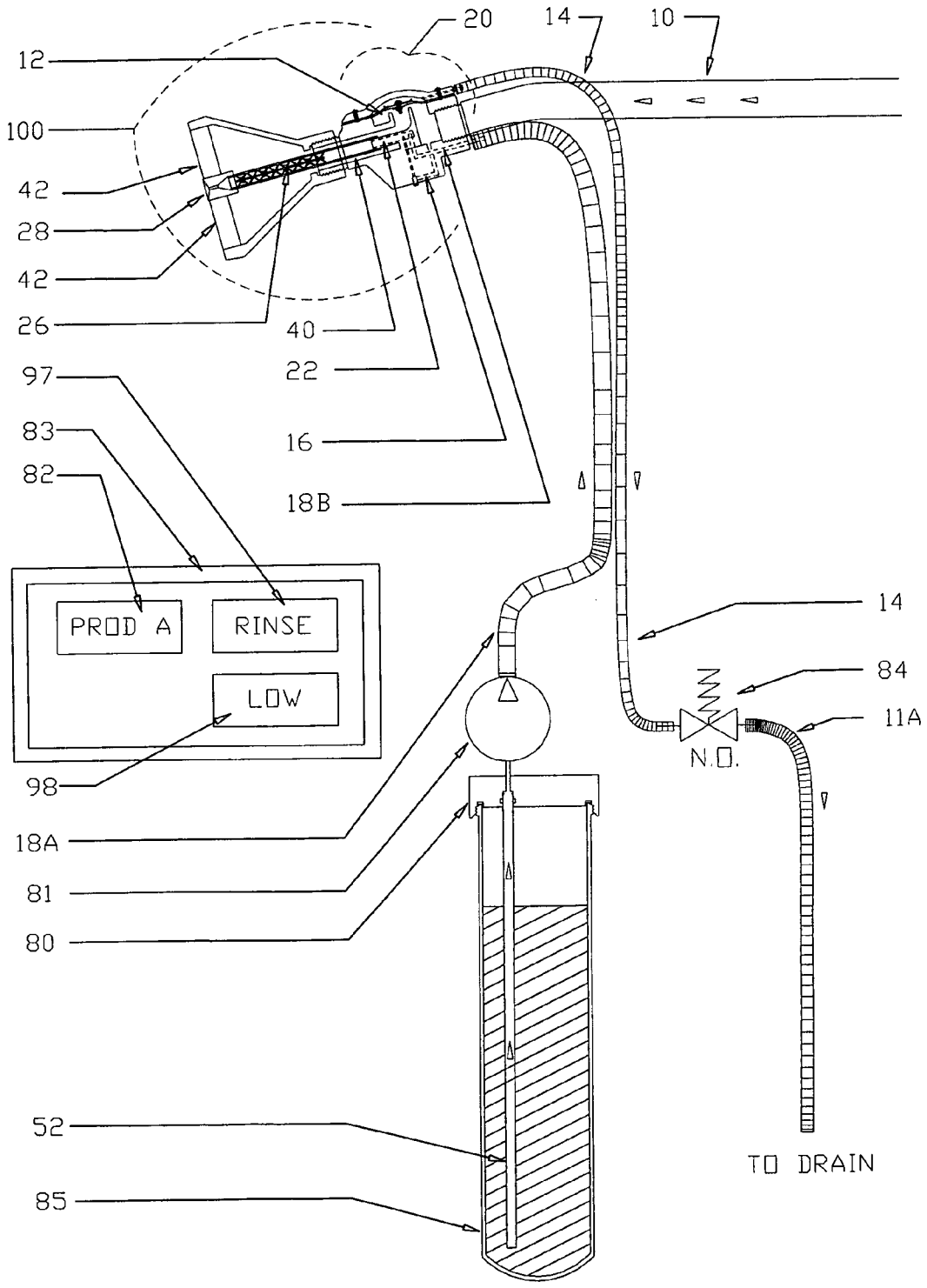


FIGURE 6

FIGURE 7


20
14
10
12
100
42
28
42
26
40
22
97
83
82
16
18B
PROD A
RINSE
LOW
98
14
84
11A
N.O.
18A
81
80
52
85
TO DRAIN

SHOWER DEVICE WITH MULTI-PRODUCT DISPENSING CAPABILITY

BACKGROUND OF THE INVENTION

The present invention is a device for dispensing at least one product, in addition to water, through a shower head. More particularly, it is a device that conserves product, by using a coaxial shower nozzle that has separate flow channels for water and the product selected by a user.

The prior art contains a variety of shower devices that mix water and a product, such as soap or shampoo, in a shower head. One such device as taught by Greenhut, et al in U.S. Pat. No. 4,358,056 uses a coupling that produces a venturi effect to pass shower water and draw in a liquid product from a reservoir. Garneys in U.S. Pat. No. 5,333,789 teaches the use of an insert located between a water inlet pipe and a shower head that diverts the water to a reservoir containing product where the water mixes with the product before entering the shower head. The device taught by Lacy in U.S. Pat. No. 4,219,158 uses a mixer disc in a shower head to intimately water spray with one or two products in a reservoir. The device taught by Davison in U.S. Pat. No. 4,218,013 uses an insert between a shower head and a water inlet pipe to introduce a product stored in a reservoir and selected by a valve into the water stream entering the shower head.

Most other shower head mixing devices, such as the shower soap dispenser taught by Bishop in U.S. Patent Application US 2013/0186971, use a vacuum-Venturi effect to draw a product into the water flow. This requires a very high vacuum to operate properly and generates noise because of the high velocity of fluid traveling across the Venturi. The instant invention uses pressure to force the flow of product into the shower head to eliminate the noise from the Venturi operation. Conventional shower hear mixing devices do not allow for fine regulation of the concentration of a product in the water flow leaving a shower header. Too often the product is too dilute in the stream leaving the shower head. This wastes the product and the water in the stream. In contrast, the instant invention has a two-stage coaxial shower head that allows for either conventional water flow or a low rate flow of water and product with just enough water to spray the product on the user's body. This eliminates undue dilution of the product.

SUMMARY OF THE INVENTION

This invention has a two-stage coaxial shower head that allows conventional water flow through the shower head or a mixture of product and water through a product low flow nozzle. The product may be such liquids as soap, moisturizer, shampoo, or hair conditioner. Products are contained within product pressure reservoirs. There may be more than one such reservoir. In fact, it is preferred to have more than one product, so that, for example, soap and moisturizer can be dispensed in succession. In the drawings, two reservoirs are shown for illustration. During a shower, a user rotates a selector dial at the multi-ported spool valve to select a product or conventional water flow for rinsing,

When a product is selected water flow through a water supply tube from the multi-ported spool valve to the shower head will cease. This will cause the pilot operated shut-off valve in the shower head mechanism to close, which in turn will cause water to stop flowing through water high flow head and will redirect pressure to force water down through the water pressure supply tube to the multi ported spool valve and the selected product pressure reservoir's water pressure supply tube. A differential pressure is set up that will force product in this reservoir chamber up from the top of the reservoir through a product supply tube into the stage 1 mix chamber in the shower head mechanism. At the same time, water will be passing through the low flow adjustment valve into the stage 1 mix chamber where it will mix with the selected product. After further mixing in the stage 2 mix chamber, the product-water mixture will exit the shower head through the product low flow nozzle.

The invention has an object of providing a high concentration water-product mixture without waste of water and product from excess dilution of product. Efficient use of water is made possible by use of a pilot operated shut-off valve. Another object is to provide the user with the ability to control the speed and concentration of the of the product flow to the product low flow nozzle by use of a flow control dial. Still another object is to allow a user to apply different produces in succession on parts of the body that are difficult to reach by hand.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS

FIG. **1** is a side view of the invention.

FIG. **2** is a front view of the invention.

FIG. **3** is a top view of the part of the invention with the product pressure reservoirs.

FIG. **4**A shows the liquid flow through the shower head when the selector dial is set art rinse.

FIG. **4**B shows the liquid flow through the shower head when the selector dial is set intermediate between rinse and a product

FIG. **4**C shows the liquid flow through the shower head when the selector dial is set to a product.

FIG. **5** shows a side view of the spool valve assembly.

FIG. **6** shows the top view of the spool valve assembly and selector dial.

FIG. **7** shows the device with an electric product pump instead of a hydraulic pump and an electrically operated valve with a electrical touch pad instead of a spool valve.

DETAILED DESCRIPTION OF THE INVENTION

In the preferred embodiments, and as shown in FIG. **1** through FIG. **7**, the invention has two main assemblies: a shower head assembly **100** and below it a product supply assembly **200**, the two assemblies being connected by tubes. A water supply **10** that emerges from a wall **60** enters an intermediate section **20** of the shower head assembly. If a selection dial **30** located at the top of the product supply assembly is not set to a product, but rather to water rinse **59** a pilot operated shut-off valve **12** in the intermediate section of the shower head assembly will be open and water will pass through the intermediate section to a coaxial head **40** and to a water high flow head **42** as in a conventional shower head.

A pilot operated control tube **14** extends to the pilot operated shut-off valve **12** in the shower head assembly from a multi ported spool valve **32** in the product supply assembly that is controlled by the setting of the selection dial **30**. When the selector dial is set to a product, either P1 **57** for product 1 or P2 **58** for product 2, water flow through the pilot operated control tube **14** will be turned off. This will cause the pilot operated shut-off valve **12** to close, thus stopping water flow through the water high flow head **42** and redirecting pressure to force water through a water pressure supply port **16**A which flows through channel **16** and through tube **16**C, to =multi-ported spool valve **32** and to the selected product

pressure reservoir's **50** water pressure supply tube **52**. Each product pressure reservoir has a product separation piston **54** that separates water in the lower part of the reservoir from product in the higher part. This piston **54** has resilient sealing surface at the outside diameter which seals against the inside diameter of product pressure reservoir's **50** and at the inside diameter which seals against the outside diameter of supply tube **52**. The water flowing into the lower part of a product pressure reservoir **51** from the water pressure supply valve sets up a differential pressure that causes the produce separation piston to rise thereby forcing product up from the top of the product pressure reservoir **50** through the product supply tube **18**B (for the right hand product pressure reservoir as shown in FIG. **2**) into the stage 1 mix chamber **22** in the shower head assembly.

A flow control dial **56** at the head of each product pressure reservoir can be used to control the speed of the product entering the product supply tube, and the concentration of the mixture of product and water comes out of the product low flow nozzle **28**. At the same time, a small amount of water from the water supply will be passing through a slow flow adjustment valve **24** into the stage one mix chamber **22** to begin mixing with the product. This water will mix further with the product as it passes through a stage 2 mix chamber **26** and out of the product low flow nozzle **28**. Valve **24** can be closed off to allow only product to flow out nozzle **28** if desired.

If the selector dial **30** has a position intermediate between rinse water and a product as shown in FIG. **4**B, the pilot operated shut-off valve will be closed causing liquid in the shower head to leave the shower head through the product low flow nozzle **28**. However, for this selector dial position, the multi-ported valve **32** will be closed so that product will not pass through a product supply valve. Hence, only a low flow of water will leave the product low flow nozzle.

FIG. **4**A shows a detail of shower head assembly **100** with the selector dial **30** set toward RINSE **60**. In this position, the multi-ported spool valve **32** aligns internal port **73**, connecting ports **63** and **72**. This allows the water pressure above diaphragm **87** in the shower head assembly to pass through a hole in this diaphragm **88** into the cavity created by cap **89** which forces this flow to tube **14** and to the drain at port **11** on assembly **200**. This allows diaphragm **87** to lift and open flow of water from water source **10** through the valve seat **90** and out through annular space to the water high flow head **42**. Cap **89** creates a pressure chamber for the valve, above the diaphragm **87** and has a vent channel and tube **14**. Item **89** is screwed or clamped onto valve housing **86**.

FIG. **4**B shows a detail of shower head assembly **100** with the selector dial **30** set between RINSE **59** and the product 2 (P2) setting **58**. In this position the multiported spool valve **32** shuts the connection between ports **63** and channel **73**. This stops the water from draining out of port **11** and causes the water pressure above diaphragm **87** to build and force the diaphragm down, causing it to close onto valve seat **90**. This closes off the water flow to the high flow head and only allows flow through port **16**A and channel **16** and slow flow adjustment valve **24** which flows through channel **16**B to the low flow nozzle **28**, shown as stream **92**.

FIG. **4**C shows a detail of shower head assembly **100** with the selector dial **30** set to the product 2 (P2) setting **58**. In this position the multi-ported spool valve **32** shuts off the connection between ports **63** and –. This stops the water from draining out of port **11** and causes the water pressure above diaphragm **87** to build and force the diaphragm down to close the diaphragm on to valve seat **90**. This closes off the water flow to the high flow head and only allows flow through port **16**A and channel **16** and slow flow adjustment valve **24** which flows through channel **16**B to the low flow nozzle **28**. Water flows from channel **16** through the water pressure supply tube **16**C to the ports **65** and **71** on the multi-ported spool valve **32**. When this valve is in the P2 position, it will allow water pressure to flow out of port **67** through down tube **52** applying force to the lower area **51** of product pressure reservoir's **50**, as shown in FIG. **2**. This will drive up the product separation piston **54** and applies pressure to the product above a plate through valve **56** and up tube **18**B and into the back of stage one mix chamber **22**, through the inline mix chamber **26**. This provides a combined controlled mixture of water and product that leaves the shower head assembly through low flow nozzle **28**, the mixture being shown as stream **93**.

FIG. **5** and FIG. **6** each show a view of the multi-ported spool valve **32**. These drawings show the valve body **64** and the spool valve **66**, which is rotated by selector dial **30**. The chambers of the valve are sealed by O-ring **62**. With the selector dial in the RINSE position **59**, the valve allows flow in ports **63** and out port **11**. In the P1 **57** position, the valve allows water flow through ports **71**, aligns the spool valve **66** so channel **70** connects **71** and **68**. This allows the increased water pressure to flow to the lower water side **51** of product pressure reservoir **50**, to force the product up to the shower head assembly **100** via product tubes **18**A. In the P2 **58** position, the valve allows water flow through ports **65**, aligns the spool valve **66** so channel **69** connects **65** and **67**. This allows the increased water pressure to flow to the lower water side **51** of product pressure reservoir **50**, to force the product up to the shower head assembly **100** via product tubes **18**B.

In an alternative embodiment, valves are controlled electrically rather than hydraulically. Electrically controlled valves and a product pump are used instead of a product pressure reservoir **50** as shown in FIG. **7**. Product is pumped to the shower head when the Product A button is pressed on a touch pad **83**. There may be multiple products. One product is shown in FIG. **7** for clarity. The choices of Product A, Rinse, or Low, equivalent to a selector dial setting between rinse and product in the hydraulic embodiment, as described above. Product is stored in a non-pressurized reservoir **85**, with reservoir cover **80** and is pumped with an electrically operated pump **81** to the shower head assembly **100** when selected from a touch pad **83** by pressing button **82**. When the Rinse button **97** is selected, valve **84** remains open and allows water to drain from tube **11**A which keeps the pilot valve **12** in the open position, and water will pass through the intermediate section **20** to a coaxial head **40** and to a water high flow head **42** as in a conventional shower head. The pilot valve **12** can be performed by alternate valve designs using electrical actuation. When the Low button **98** is selected, valve **84** will be energized and will close and stop the water from draining from tube **11**A. This forces pilot valve **12** to close so that water will only pass through low flow passage **16** to passage **22** and out low flow nozzle **28**. To dispense product, press the product button **82**. When Product A button **82** is pressed, valve **84** will close, shutting off drain tube **11**A and turning off the high water flow through tube **14** that extends to intermediate section **20**. Pump **81** draws the product from tube **52** and pumps it through tube **18**A and into the shower head assembly. Conventional battery operated power or direct grid connected power can be used. A rotary switch or other electrical switch device can be used in place of the touch pad, to control the electrical signals.

We claim:

1. A shower device with multiple product dispensing capabilities comprising:

a shower head assembly containing a water supply, a coaxial shower head with a water high flow head and a product flow nozzle, at least one product-water mixing chamber, and a pilot-operated shut-off valve that controls flow of rinse water from the water high flow head;

a product supply assembly containing at least one product pressure reservoir, each product pressure reservoir having a lower part containing water and a upper part containing product, the upper part and the lower part being separated by a piston, and with a tube for supplying water to the lower part; a multi-ported spool valve and an associated selector dial that determine whether the device operates in rinse mode or product dispersing mode,

means for conducting product from each pressure product reservoir to a mixing chamber in the shower head assembly;

means for directing water from the shower head assembly to the product supply assembly when the pilot shut-off valve is closed and turning off water flow to the shower head providing product with increased concentration; and

a pilot-operated control tube that shuts off water flow from the pilot-operated shut-off valve, closing said valve when the selector dial is set to other than rinse mode.

2. A shower device with multiple product dispensing capabilities as set forth in claim **1** further comprising a low flow adjustment valve directing water from the water supply to a product mixing chamber to mix with product, this low flow adjustment valve being able to turn off this mixing water flow and only allow product.

3. A shower device with multiple product dispensing capabilities as set forth in claim **2** wherein the means for conducting product from each pressure product reservoir to a mixing chamber in the shower head assembly is a tube.

4. A shower device with multiple product dispensing capabilities as set forth in claim **2** wherein the means for conducting product from each pressure product reservoir to a mixing chamber in the shower head assembly is a channeled port.

5. A shower device with multiple product dispensing capabilities as set forth in claim **3** wherein the means for directing water from the shower head assembly to the product supply assembly when the pilot shut-off valve is closed is a tube.

6. A shower device with multiple product dispensing capabilities as set forth in claim **2** further comprising a flow control dial for each product pressure reservoir to control the speed and concentration of the product entering the product supply tube.

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